

## SEQUENCE OF OPERATION

### Modulating Economizer

The purpose of an economizer is to use outdoor air for cooling, whenever possible, to reduce compressor operation.

The economizer system initially responds to a signal from the cooling thermostat and functions as a true first stage for cooling, while providing maximum fuel economy. The economizer is automatically locked out during the heating mode and holds the outdoor air damper at the minimum position settings.

During the occupied period, the discharge sensor provides a signal to the actuator during free cooling or economizer mode. The signal opens the economizer damper until the discharge temperature drops below 50 degrees F. At this time the signal causes the motor to drive the damper back to minimum position. As the discharge temperature climbs to 60 degrees F the motor will drive back open. During the occupied period, the actuator will not close past the minimum position.

If the fully open actuator cannot satisfy the space demand, mechanical cooling is sequenced on.

During the unoccupied period, the actuator will override minimum position setting and drive fully closed. On a loss of power, the actuator will spring return fully closed.

When in heating operation, or when outdoor air temperature or enthalpy conditions are high, economizer operation is locked out, and actuator is held at minimum position.

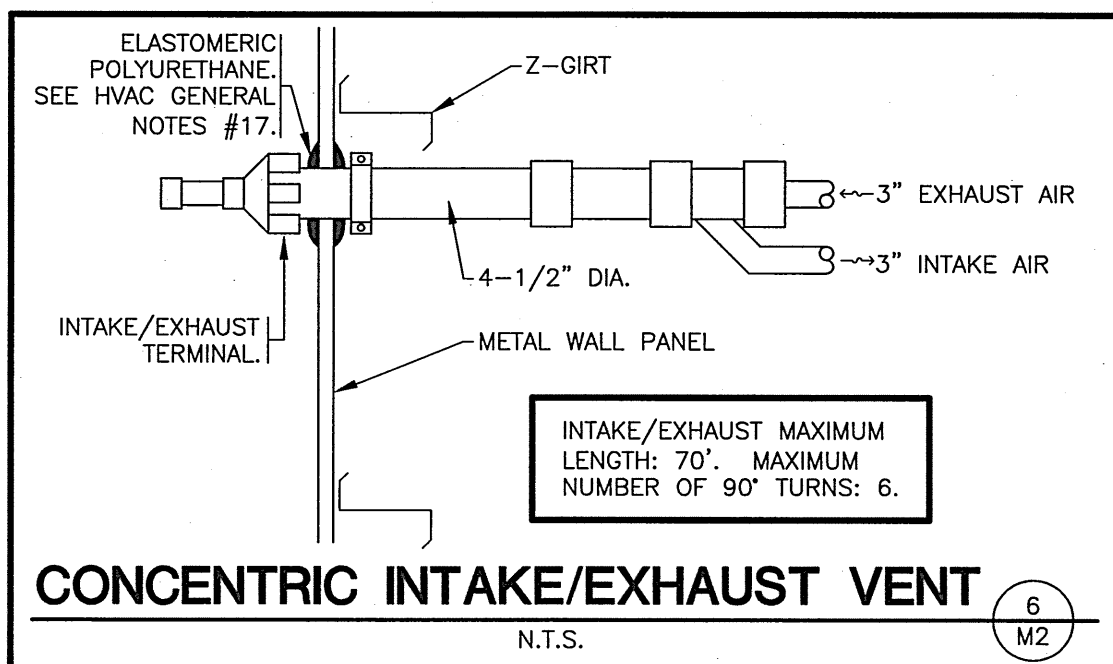
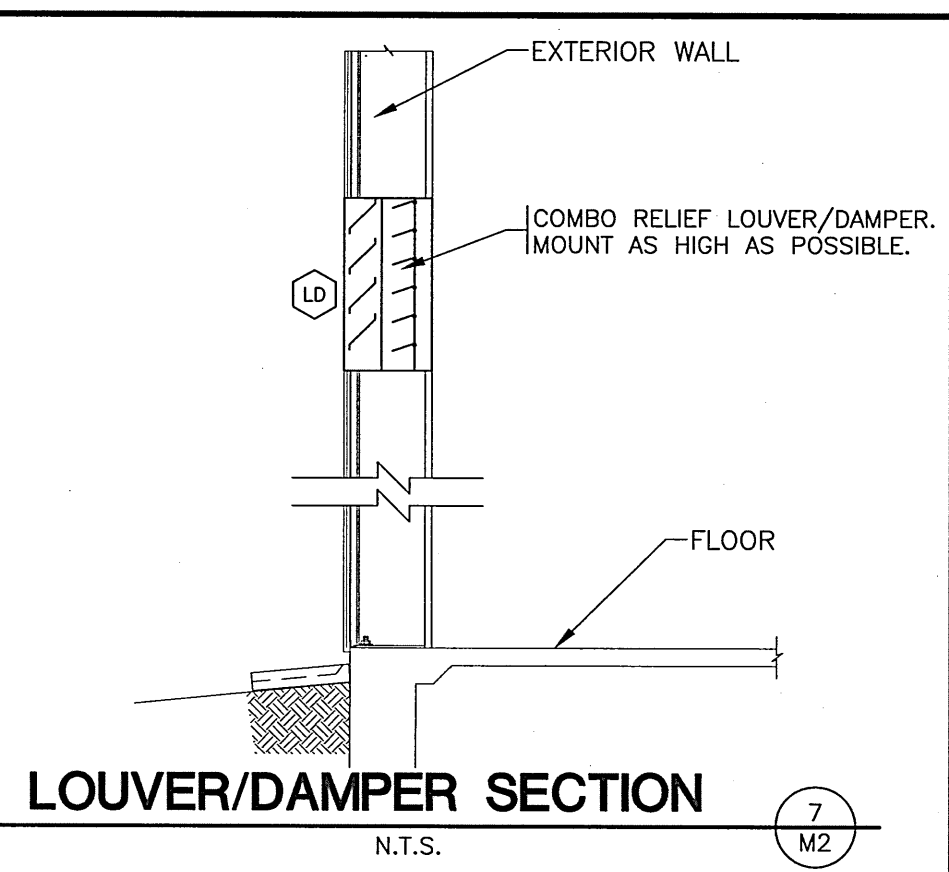
The staging relay is used when the first stage compressors must provide mechanical cooling when assisting the economizer.

The staging relay can be omitted when the second stage compressors can be used to assist the economizer with mechanical cooling.

## GRILLE AND DIFFUSER SCHEDULE

| MARK | DESCRIPTION                  | MFR.          | CATALOG NUMBER | SIZE (in.)   | FINISH | MOUNTING       | BRANCH DUCT SIZE | ACCESSORIES | REMARKS | REF. DETAIL |
|------|------------------------------|---------------|----------------|--------------|--------|----------------|------------------|-------------|---------|-------------|
| (G)  | SUPPLY GRILLE                | ANEMOSTAT     | S2H0           | 14x14        | WHITE  | DUCT           | SEE PLAN         | OB          | △       | -           |
| (S)  | SUPPLY DIFFUSER              | ANEMOSTAT     | E-1-D          | 12x12        | WHITE  | SURFACE        | SEE PLAN         | DT          | △       | 4/M2        |
| (S2) | SUPPLY DIFFUSER              | ANEMOSTAT     | EPL            | 24x24        | WHITE  | DUCT/LAY-IN    | SEE PLAN         | -           | △       | 2/M2        |
| (R)  | RETURN GRILLE                | ANEMOSTAT     | S3HD-81        | 24x24        | WHITE  | LAY-IN/EXPOSED | SEE PLAN         | -           | △       | 1/M2        |
| (R2) | RETURN GRILLE                | ANEMOSTAT     | S3HD-81        | 12x12        | WHITE  | SURFACE        | SEE PLAN         | -           | △       | 1/M2        |
| (X1) | EXHAUST GRILLE               | ANEMOSTAT     | S3HS           | 12x12        | WHITE  | CEILING        | SEE PLAN         | OB          | -       | -           |
| (F)  | FRESH AIR WALL CAP           | COOK          | WCA-8          | 20x6         | MILL   | SURFACE        | SEE PLAN         | -           | -       | -           |
| (M)  | MOTORIZED DAMPER             | NCA           | SDS57          | SAME AS DUCT | -      | DUCT           | SEE PLAN         | -           | -       | -           |
| (LD) | COMBO RELIEF LOUVER & DAMPER | VENT PRODUCTS | 2700           | 48x32        | -      | WALL           | -                | -           | △       | 7/M2        |
| (L)  | OUTSIDE AIR INTAKE LOUVER    | VENT PRODUCTS | 3600           | 48x32        | -      | WALL           | -                | -           | △       | -           |
| (IV) | INTAKE VENTILATOR            | COOK          | PR             | 20           | MILL   | ROOF           | SEE PLAN         | RC,MD       | △       | -           |
| (RV) | RELIEF VENTILATOR            | COOK          | PR             | 30           | MILL   | ROOF           | SEE PLAN         | RC,GD       | △       | -           |

| ACCESSORIES                                                                                                                                                                  | REMARKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OB - OPPOSED BLADE DAMPER.<br>DT - DIRECTIONS, TABS.<br>RC - ROOF CURB TO MATCH ROOF (BY CONTRACTOR)<br>MD - 2-POSITION MOTORIZED DAMPER.<br>GD - GRAVITY BACK DRAFT DAMPER. | △ 1-WAY △ 4-WAY<br>△ DIRECTIONAL TABS, ADJUST TO PROVIDE THROW AS INDICATED ON PLANS.<br>△ PROVIDE 1" FIBERGLASS FILTER FOR GRILLE.<br>△ RELIEF DAMPER WITH GRAVITY FABRIC BLADES FOR RELIEF OF ECONOMIZER AIR (4,000 CFM MAXIMUM EACH).<br>△ CONTRACTOR SHALL PROVIDE INTERLOCK WIRING BETWEEN INTAKE LOUVER AND ECONOMIZER. INTAKE LOUVER SHALL BE "CLOSED" WHENEVER ECONOMIZER IS IN 100% RETURN AIR UNOCCUPIED MODE. INTAKE LOUVER SHALL BE "OPEN" WHENEVER ECONOMIZER DAMPERS OPEN FOR FREE COOLING AND FRESH AIR INTAKE OCCUPIED MODES.<br>△ RELIEF VENTILATOR FOR RELIEF OF ECONOMIZER AIR (4,300 CFM MAXIMUM EACH). |
| APPROVED ALTERNATE MANUFACTURER'S                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| GRILLES, DIFFUSERS & DAMPERS:<br>*TUTTLE & BAILEY *NAILOR *ARROW *CARNES<br>*PRICE INDUSTRIES *TITUS *KRUEGER                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



## NATIONAL ACCOUNT FURNACE & CONDENSING UNIT SCHEDULE - GAS

- ALL CARRIER HVAC UNITS WITH ACCESSORIES ARE OWNER SUPPLIED BY O'REILLY AUTOMOTIVE.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF ALL CARRIER HVAC UNITS.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR THE FIRST YEAR LABOR WARRANTY ON ALL OWNER SUPPLIED EQUIPMENT.
- MECHANICAL CONTRACTORS WORKING ON O'REILLY PROJECTS MUST CALL "CARRIER CORPORATION'S NATIONAL ACCOUNTS" DEPARTMENT FOR CONFIRMATION OF ORDERS AND BILL OF MATERIALS.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SCHEDULING, SHIPPING & RECEIVING OF ALL CARRIER UNITS FROM CARRIER NATIONAL ACCOUNTS. CONTACT PERSON(S) LISTED TO THE RIGHT.

CARRIER CORPORATION,  
NATIONAL ACCOUNTS  
29 INDUSTRIAL PARK DR.  
BINGHAMTON, NY 13904

GENERAL MANAGER:  
DOUGLAS MASCH  
CELL 317-370-2727  
doug.masch@carrier.utc.com

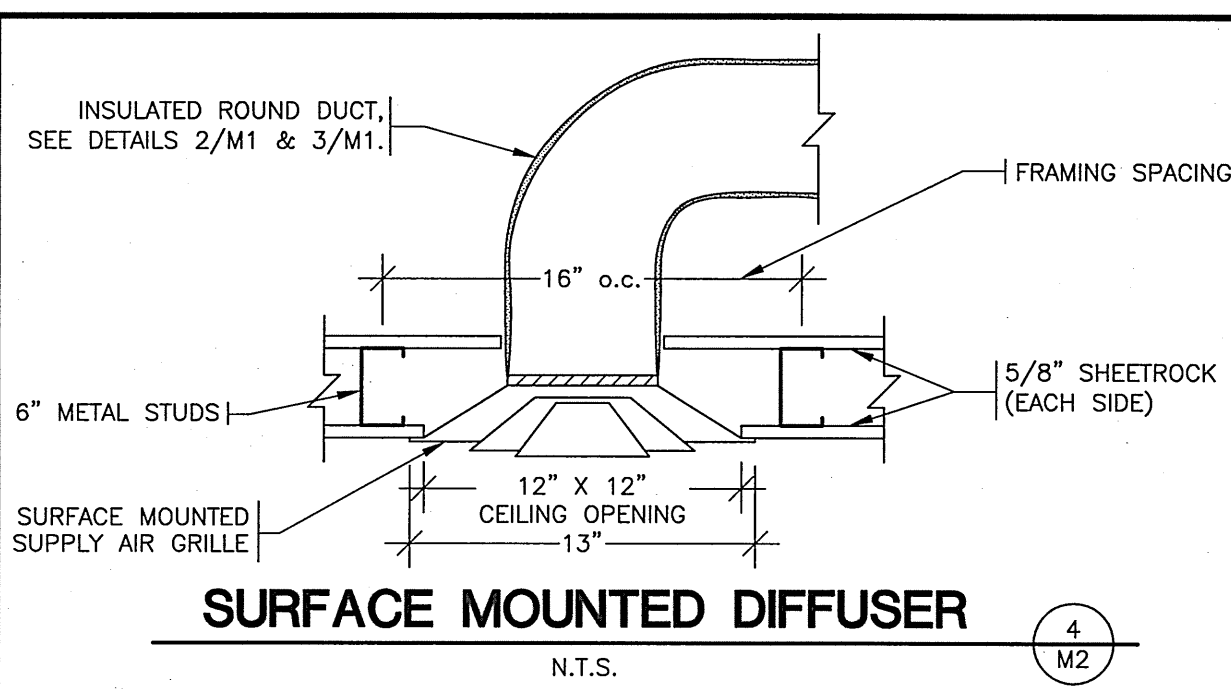
CUSTOMER SERVICE REPS:  
SARA TILTON  
866-389-4658 EXT. 3429  
sara.tilton@carrier.utc.com

| MARK   | DESCRIPTION                        | MFR.    | CATALOG NUMBER   | HTG. MBH IN OUT | AFUE | CLG. MBH TOT. SENS. | SEER | SUPPLY FAN CFM MIN. O.A. | ESP  | HP  | V/PH       | MCA  | MOCF | Wt. (lbs.) | ACCESSORIES                        | REMARKS | REF. DETAIL |
|--------|------------------------------------|---------|------------------|-----------------|------|---------------------|------|--------------------------|------|-----|------------|------|------|------------|------------------------------------|---------|-------------|
| FURN-1 | GAS FURNACE HORIZONTAL CONFIG.     | CARRIER | 59SP5A100E21--20 | 100 97          | 96.3 | -                   | -    | 1980                     | 0.6  | 1.0 | 115/1φ     | 15.6 | 20   | 170        | TS1,SP,CV,ECO, TXV,VT,RS           | △ △     | 1/M2        |
| FURN-2 | EVAPORATOR COIL HORIZONTAL CASED N | CARRIER | CNPHP6024        | -               | -    | -                   | -    | -                        | -    | -   | -          | -    | -    | 81         | -                                  | -       | -           |
| CDU-1  | CONDENSING UNIT (5-TON)            | CARRIER | 24ACC660A003     | -               | -    | -                   | 53.5 | 42.5                     | 15.0 | -   | 208/230 1φ | 28.0 | 40   | 340        | SACR,CH,WSC, EF,RFD,RTI, SS,LAC,DS | △ △ △   | -           |

|                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACCESSORIES – FACTORY SUPPLIED AND INSTALLED                                                                                                                                                                                                                                                                                                                                                 | ACCESSORIES – FIELD SUPPLIED & FIELD INSTALLED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SS – SAFETY SWITCHES – HI & LOW REFRIGERANT, (STANDARD)<br>TXV – THERMOSTATIC EXPANSION VALVE KIT (R410A). (INCLUDED W/ EVAPORATOR COIL)<br>CH – CRANKCASE HEATER, "CARRIER" (STANDARD ON UNIT)                                                                                                                                                                                              | RFD – REFRIGERANT FILTER DRYERS.<br>RTI – REFRIGERANT TUBING, (3/8" LIQUID, 1-1/8" VAPOR, MAXIMUM TOTAL EQUIVALENT 80' LENGTH)<br>INSULATION & PROTECTIVE R410 CHARGE<br>ECO – 100% ECONOMIZERS, "MICROMETL" #0832-1200-98931 3-POSITION CONTROL SYSTEM, ADJUSTABLE DRY BULB CONTROLLED, INTERNALLY INSULATED, LOW LEAK, PAINTED W/BLADES. CONNECT VIA MECHANICAL LINKAGE. INTERLOCK ECONOMIZER OPERATION W/MOTORIZED DAMPER @ INTAKE LOUVER (L1). SEE "GRILLE SCHEDULE" FOR MORE INFO. ON INTERLOCK OPERATION.                                                                                                                                                                                                                                                                                                                                                                                               |
| ACCESSORIES – FACTORY SUPPLIED & FIELD INSTALLED                                                                                                                                                                                                                                                                                                                                             | REMARKS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CV – CONCENTRIC VENT 3". "CARRIER" #KGAVT0801CTV.<br>SACR – START ASSIST – CAPACITOR RELAY, "CARRIER" #KSAHS1701AAA<br>EF – EVAPORATOR FREEZE/STAT, "CARRIER" #KAAFT0101AAA<br>WSC – WINTER START CONTROL, "CARRIER" #KAAWS0101AAA<br>VT – VENT TRAP, "CARRIER" #KGAET0201ETK<br>LAC – LOW AMBIENT CONTROL, "CARRIER" #KSALA0301410<br>HTG – HORIZONTAL TRAP GROMMET "CARRIER" #KGACK0101HCK | ⚠ HEATING CAPACITY BASED ON 47°F db/43°F wb OUTDOOR AIR TEMPERATURE AND 70°F db ENTERING INDOOR COIL.<br>⚠ COOLING CAPACITY (TOTAL) BASED ON 80°F EDB AND 67°F EWB, 95°F AMBIENT TEMPERATURE.<br>⚠ ADJUST TO CFM'S SHOWN.<br>⚠ NOTE DURING CONSTRUCTION: CARRIER FACTORY INSTALLS A TEMPORARY AIR FILTER INSIDE EACH FURNACE. THESE TEMPORARY AIR FILTERS SHALL REMAIN IN PLACE DURING CONSTRUCTION ONLY. NOTE AT JOB COMPLETION: CONTRACTOR SHALL REMOVE ALL RETURN AIR FILTERS FROM INSIDE ALL FURNACES. CONTRACTOR SHALL INSTALL CLEAN AIR FILTERS BEHIND EACH RETURN AIR GRILLE ONLY.<br>CONTRACTOR SHALL ALSO SUPPLY AN ADDITIONAL CLEAN SET OF FILTERS TO THE OWNER AT JOB COMPLETION. AIR FILTER(S) SHALL <u>NOT</u> BE INSTALLED OR LEFT INSIDE ANY FURNACE.<br>⚠ OUTSIDE AIR, SEE PLAN FOR UNIT(S) REQUIRING OUTSIDE AIR.<br>⚠ REFRIGERANT = R410A.<br>⚠ MAXIMUM CIRCUIT BREAKER OR TIME-DELAY FUSE. |
| ACCESSORIES – O'REILLY SUPPLIED & FIELD INSTALLED                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| TS – T-STAT. VENSTAR COMMUNICATING THERMOSTAT, (NO SUBSTITUTIONS). REFER TO SHEET VS1.<br>D1 – DISCONNECT SWITCH OR CIRCUIT BREAKER – (GRAYBAR/O'REILLY) SUPPLIED W/ ELECTRICAL BILL OF MATERIALS.<br>RS – VENSTAR REMOTE SENSOR (NO SUBSTITUTIONS). REFER TO SHEET VS1.                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

INSULATED ROUND DUCT,  
SEE DETAILS 2/M1 & 3/M1.

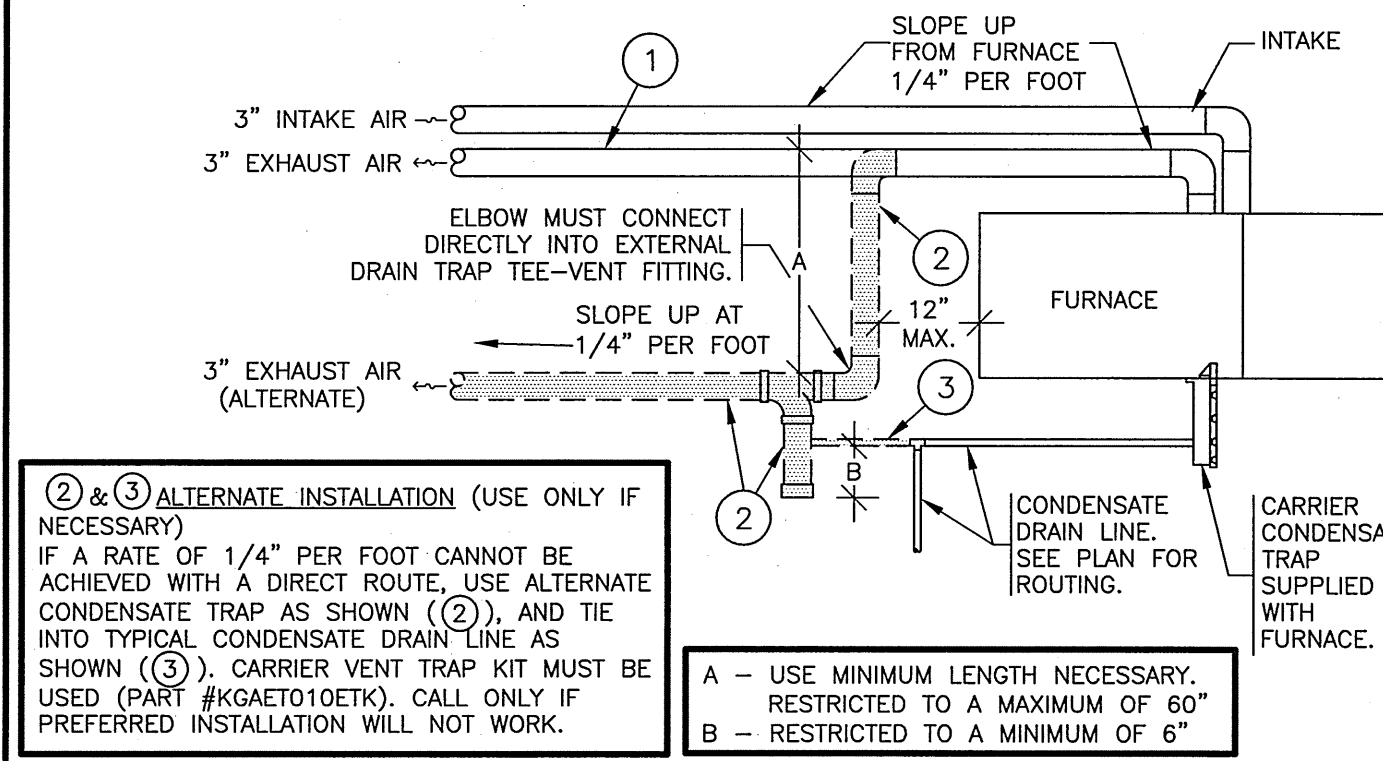
FRAMING SPACING



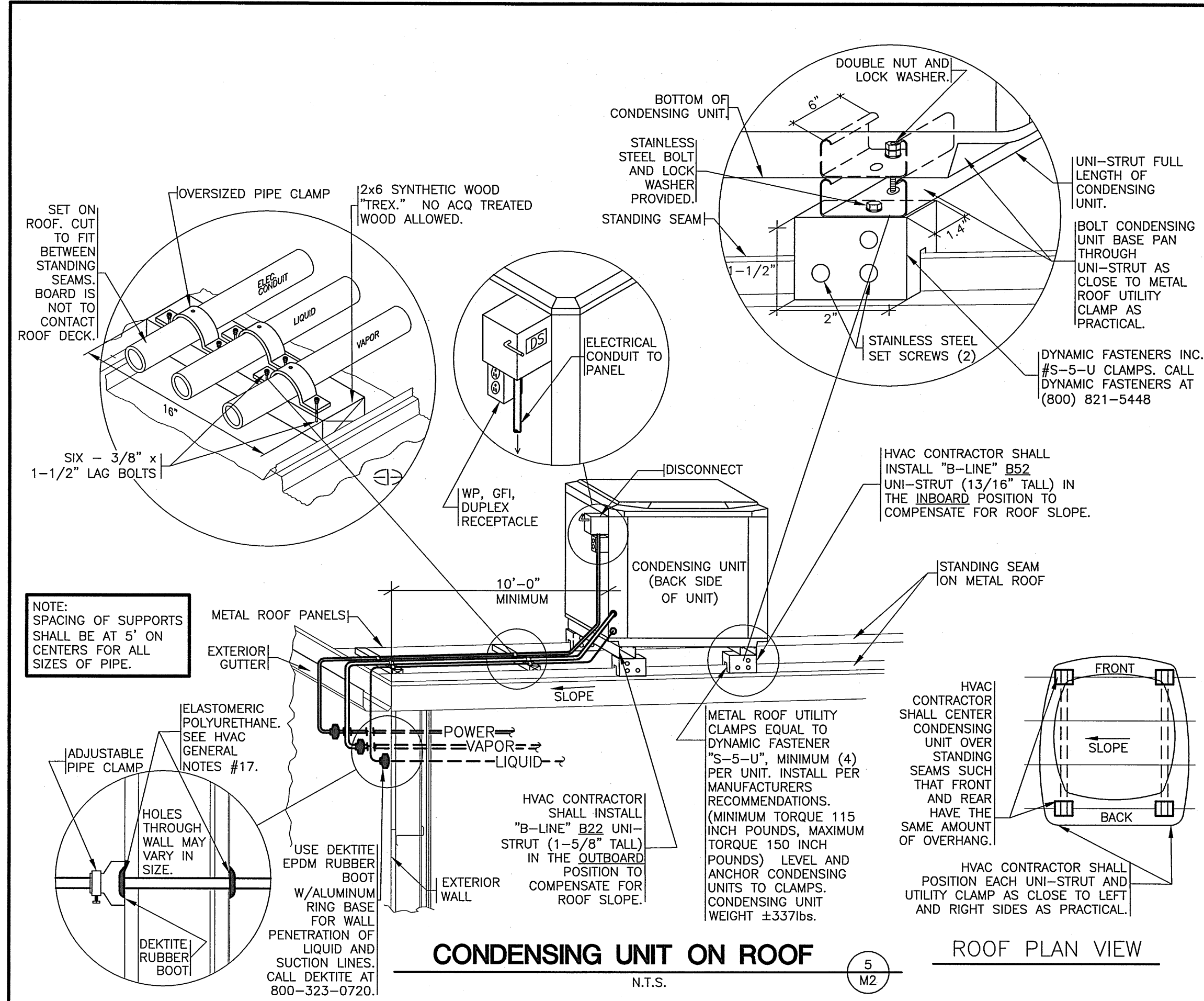
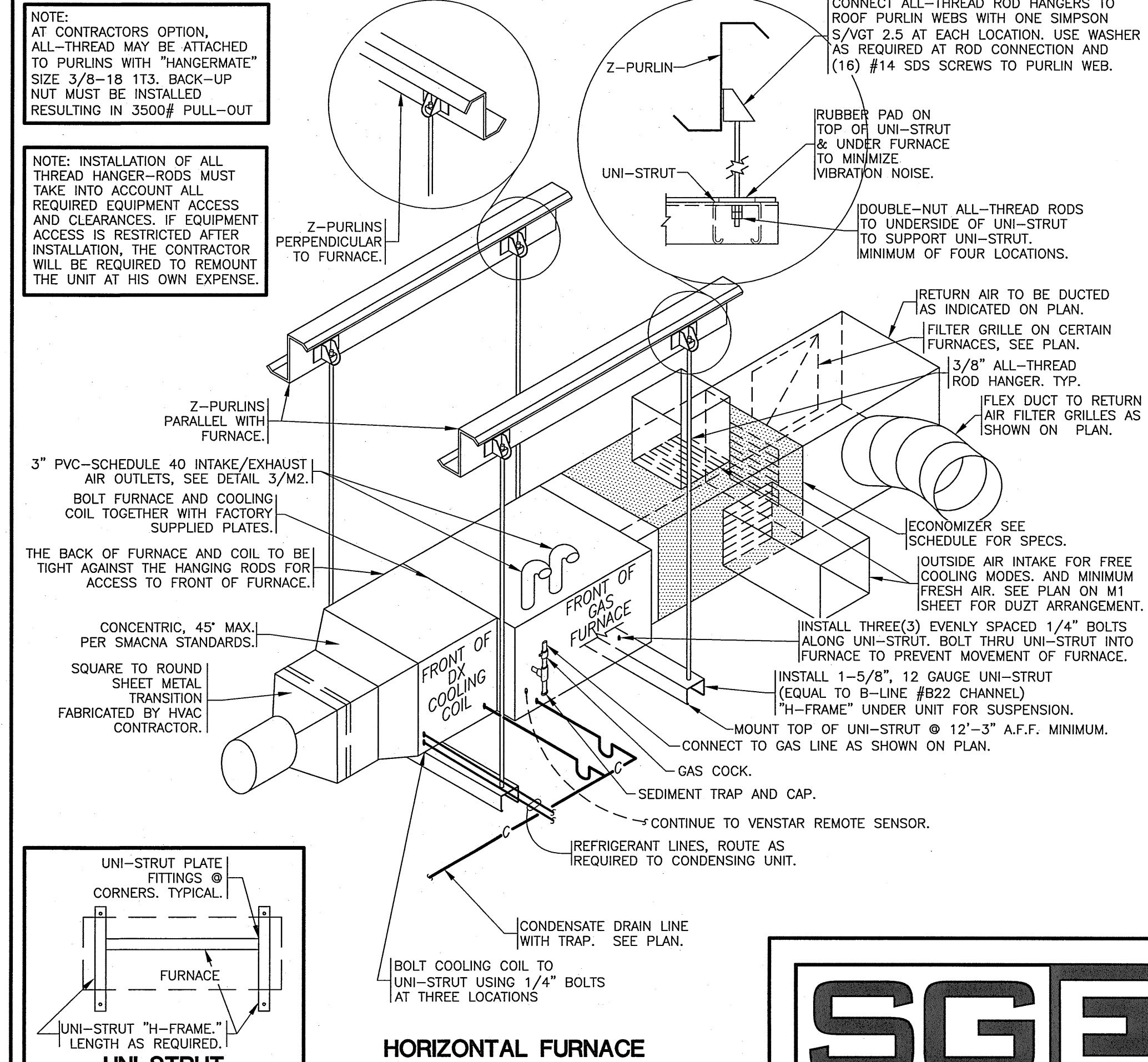
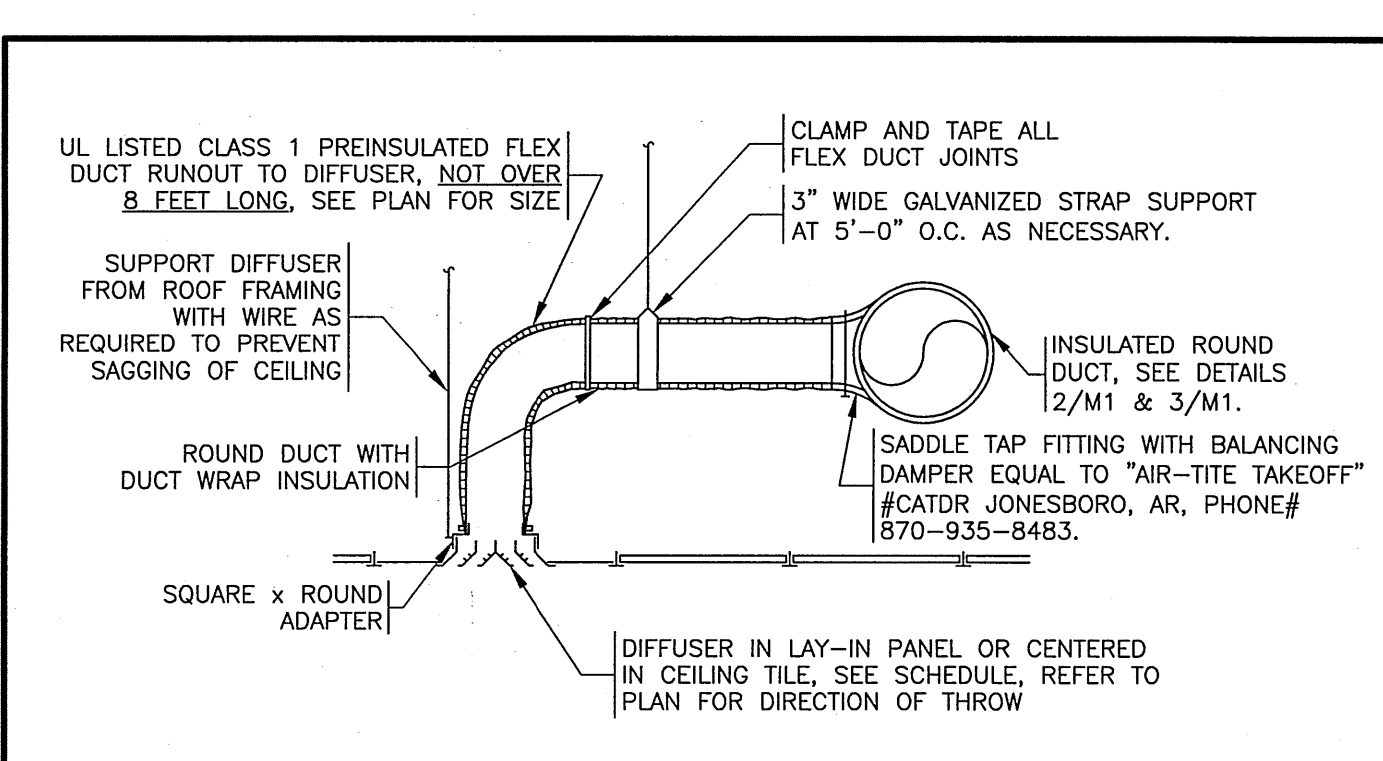
## FAN SCHEDULE

| MARK                                                                                               | DESCRIPTION                        | MFR. | CATALOG NUMBER | CFM (NOM) | STATIC PRESS. | MOTOR H.P. | ELECTRICAL                                                                                                                             |     |      | ACCESSORIES | REMARKS | REF. DETAIL |
|----------------------------------------------------------------------------------------------------|------------------------------------|------|----------------|-----------|---------------|------------|----------------------------------------------------------------------------------------------------------------------------------------|-----|------|-------------|---------|-------------|
|                                                                                                    |                                    |      |                |           |               |            | V/PH                                                                                                                                   | MCA | MOCF |             |         |             |
| EF-1                                                                                               | DOUBLE RESTROOM INLINE EXHAUST FAN | COOK | GN-640         | 500       | 0.1           | 350W       | 120/1                                                                                                                                  | -   | -    | BD,DS,WC    | ⚠ ⚠     | -           |
| ACCESSORIES                                                                                        |                                    |      |                |           |               |            | REMARKS                                                                                                                                |     |      |             |         |             |
| BD - GRAVITY BACK DRAFT DAMPER<br>DS - DISCONNECT SWITCH<br>WC - WALL CAP, "COOK" #WCA-6, ALUMINUM |                                    |      |                |           |               |            | ⚠ ADJUST FOR CFM REQUIRED.<br>⚠ EXHAUST FAN SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR TO OPERATE WITH EITHER RESTROOMS LIGHT SWITCH. |     |      |             |         |             |
| APPROVED ALTERNATE MANUFACTURER'S                                                                  |                                    |      |                |           |               |            |                                                                                                                                        |     |      |             |         |             |
| FANS: *GREENHECK *CARNES                                                                           |                                    |      |                |           |               |            |                                                                                                                                        |     |      |             |         |             |

- PREFERRED INSTALLATION  
HVAC CONTRACTOR TO ROUTE EXHAUST AIR DIRECTLY OUT OF BUILDING AT A RISE RATE OF 1/4" PER FOOT (AS INDICATED IN ①).
- HORIZONTAL PORTIONS OF THE VENTING SYSTEM SHALL BE SUPPORTED TO PREVENT SAGGING SUPPORT. SUPPORT COMBUSTION AIR PIPING (IF APPLICABLE) AND VENT PIPING A MINIMUM OF EVERY 5 FT. (1.5M) (3 FT. (.9M) FOR SDR-21 OR -26 PVC) USING PERFORATED METAL HANGING STRAP.
- SLOPE COMBUSTION AIR PIPING (IF APPLICABLE) AND VENT PIPING UPWARD FROM FURNACE A MINIMUM OF 1/4 IN. (6MM) PER LINEAR FT. WITH NO SAGS BETWEEN HANGERS.
- HORIZONTAL PORTIONS OF THE VENTING SYSTEM SHALL BE INSTALLED SO AS TO PREVENT THE ACCUMULATION OF CONDENSATE.



## FURNACE EXHAUST VENT INSTALLATION



417.862.0558  
417.862.3265  
e-mail: architect@esterlycheider.com

1736 East Sunshine, Suite 417  
Springfield, Missouri 65804

IVY STREET  
JUNCTION CITY, OR

Thomas A. Lundberg  
ARCHITECT

RECEIVED  
SEP 20 2011  
135 E. SANSBERRY ST. SUITE 417  
SPRINGFIELD, MO 65804

REGISTERED PROFESSIONAL  
ENGINEER  
#83322 PER  
08/26/14  
OREGON  
JULY 14, 2009  
NORMAN E. GOTH  
Expires: 6/30/15

NEW O'Reilly Auto Parts Store:

O'Reilly AUTO PARTS

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SPRINGFIELD, MISSOURI 65802  
417-862-2674 PHONE

04-23-14  
M2 of 3

DATE: 09-27-13  
REVISION DATE: 04-23-14

COMM # 3484